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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : B64D 9/00, B64F 1/305 — A1

(11) International Publication Number: **WO 99/42365**

(43) International Publication Date: 26 August 1999 (26.08.99)

(21) International Application Number: PCT/SE99/00213

(22) International Filing Date: 17 February 1999 (17.02.99)

(30) Priority Data:
9800507-7 20 February 1998 (20.02.98) SE

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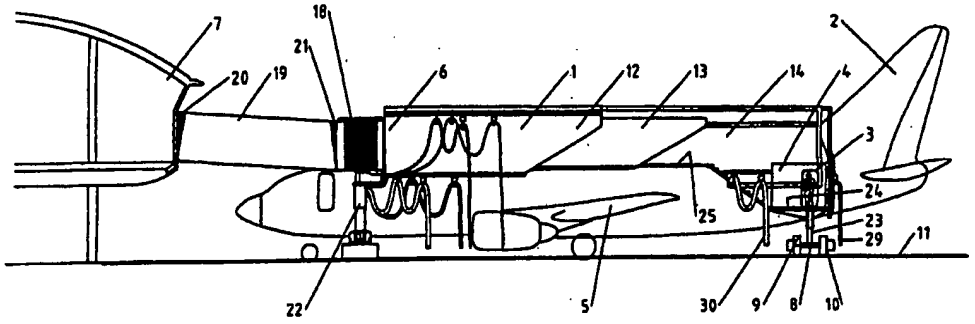
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: A METHOD OF CONNECTING A PASSENGER BRIDGE TO AN AIRCRAFT AND AN ARRANGEMENT FOR CARRYING OUT THE METHOD



(57) Abstract

A method of connecting the outer end (4) of a passenger bridge (1) to a door (3) of an aircraft which door (3) is located on one side of the aircraft and rearwardly of an aicraft wing (5), and where the inner end (6) of the passenger bridge is connected to a terminal building (7) via at least one further element for pedestrian traffic, whereby the passenger bridge can be moved through the medium of a driving apparatus (8) arranged on the outer part of said bridge and resting on wheels (9, 10) against an apron surface (11), and wherein the passenger bridge includes two or more telescopic parts (12-15). The invention is characterized by driving the bridge (1) in relation to a parked aircraft by means of said driving apparatus (8) such as to cause the driving apparatus and the outer part (4) of the passenger bridge to pass outwardly of the wing of the aircraft and thereafter in behind said wing for connection with the rear door of the said aircraft. The invention also relates to an arrangement.

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A METHOD OF CONNECTING A PASSENGER BRIDGE TO AN AIRCRAFT AND AN ARRANGEMENT FOR CARRYING OUT THE METHOD

The present invention relates to a method of connecting a passenger bridge to an aircraft and also to an arrangement to this end.

Many airports now include passenger bridges which connect a terminal building to an aircraft and via which passengers enter and leave the aircraft. Several different types of passenger bridges are known to the art, of which a so-called mobile telescopic bridge (MTB) is one, this bridge comprising a number of telescopic parts of which the outermost part is carried by a bogie equipped with separate, driven wheels. The bogie is used to manoeuvre the passenger bridge towards and away from an aircraft parked on the apron or hardstanding. Located adjacent the point of connection of the bridge to a terminal building is a rotunda that is rotatable about a vertical axis and supported by a ground-anchored column or pillar. The outermost part of the passenger bridge carries a cabin which can be turned relative to the outermost telescopic element of said bridge. The cabin is that part of the bridge which is intended for connection with an aircraft door.

One serious problem is the relatively long time it takes for passengers to board an aircraft and also to leave the aircraft when said aircraft is parked at a terminal gate. This unnecessarily lengthens the time taken from when the aircraft has landed to the time at which it can again be started-up for takeoff. The passengers involved also experience this waiting time as unnecessary.

In order to expedite passenger embarkation and disembarkation, some types of aircraft include a rear door through which passengers can enter and leave the aircraft by means of steps that are lowered from the aircraft onto the apron or tarmac. One drawback with this system is that it is necessary for passengers to walk onto the apron and then walk up steps into the passenger bridge. Certain types of aircraft have on one side of the aircraft a rear door which cannot be connected to a passenger bridge. To such a rear door a mobile steps can be connected.

It is not desirable for passengers to occupy the apron surrounding an aircraft, because of the safety risks involved.

When an aircraft has landed, many different services, such as ground-operated services, are set into motion. These services, or measures, include the connection of electric cables and hoses to the aircraft, for supplying the aircraft with electric power and for replenishing the water supply, emptying of latrines, etc. These services normally involve the use of a large number of vehicles in the vicinity of the aircraft, which further increases the time that passes between parking of an aircraft and starting-up of the aircraft for further takeoff. In addition to this delay, each vehicle in the vicinity of the aircraft represents a safety risk, for instance with regard to collision damage to the aircraft. There is a desire to reduce the number of vehicles in the close vicinity of and around the aircraft.

Aircraft tend to become both larger and longer. Connection of a telescopic passenger bridge to the fuselage of an aircraft in the proximity of a rear door situated rearwardly of a wing of said aircraft presents a serious technical problem, because of the long distance from the rotunda to said door. This distance may be in excess of 30-40 metres. One known solution to this problem involves suspending the passenger bridge in a device similar to a crane which functions to extend the bridge stably over said wing at a length which will enable the bridge to be connected to the rear door of the aircraft. This solution is both clumsy and expensive.

The present invention solves this problem and provides a simple and neat solution to the problem of connecting a passenger bridge to the rear door of an aircraft. The invention also enables ground services to be simplified.

The present invention thus relates to a method of connecting the outer end of a passenger bridge to a door provided on one side of the aircraft fuselage and rearwardly of a wing of the aircraft, wherein the inner end of the passenger bridge is connected to a terminal building through the medium of at least one further element for passenger pedestrian traffic, wherein the passenger bridge is mobilised by means of a driving apparatus which is provided on the outer part of said bridge and which rests on wheels on the apron or tarmac adjacent the aircraft, and wherein said passenger bridge includes two or more telescopic parts, said method being characterised in that, after an aircraft has been parked, the passenger bridge is driven by means of said driving apparatus in a manner such as to cause said driving apparatus and the outer part of the passenger bridge to pass externally of the

aircraft wing and thereafter in behind said wing for connection to the rear door of the aircraft.

The present invention also relates to an arrangement of the kind defined in the preamble of Claim 5 and having the characteristic features set forth in the characterising clause of said Claim.

The invention will now be described in more detail with reference to exemplifying embodiments thereof and also with reference to the accompanying drawings, in which

- Figure 1 is a side view of an inventive passenger bridge connected to the rear door of an aircraft;
- Figure 2 illustrates an inventive passenger bridge from above and in a parking position;
- Figure 3 illustrates an inventive passenger bridge from above and shows the bridge connected to the rear door of an aircraft; and
- figure 4 is a cross-sectional view of an inventive passenger bridge taken close to a rotunda to which the telescopic passenger bridge is connected.

Figure 1 is a side view of an inventive passenger bridge 1 connected to the rear door 3 of an aircraft 2.

The outer end 4 of the passenger bridge is thus adapted for connection to a door in the aircraft fuselage, said door being located on one side of the aircraft rearwardly of the illustrated wing 5 thereof. This outer end of the bridge is normally designated the cabin and can be swung about a vertical axis to a position parallel with the fuselage of the aircraft. The cabin 4 can be telescoped to a limited degree,

so that it can be brought to a position of abutment with the aircraft fuselage around the door of the aircraft.

The inner end 6 of the bridge is connected to a terminal building 7. As will become apparent from the following, connection of the inner end of the bridge with the terminal building is effected through the medium of at least one further element for pedestrian traffic.

The outer part of the passenger bridge 1 carries a driving apparatus 8 which renders the bridge mobile. The driving apparatus 8 is of a known kind that includes wheels 9, 10 which run on the surface of the apron 11 in the proximity of the aircraft. The wheels are driven individually. The passenger bridge can be driven in any desired direction by means of the driving apparatus. Further the passenger bridge typically includes two or more mutually telescopic parts 12, 13, 14, i.e. tunnel-like telescopic elements of generally rectangular cross-section. The telescopic parts are extended and retracted in response to movement of the outer part of said bridge along the apron 11 by means of said driving apparatus.

What has been described above, including the construction of the telescopic parts and the construction of said driving apparatus, is well known and need not therefore be described in more detail.

According to the invention, the passenger bridge 1 has a total length which enables it to be driven by said driving apparatus 8 in a manner such as to enable the driving apparatus and the outer part 4 of the bridge to pass

outwardly of the tip of the wing 5 of the parked aircraft 2 and thereafter in behind the wing, i.e. rearwardly thereof, and the outer part 4 of the bridge then connected to the rear door 3 of the aircraft 2.

This is illustrated in Figures 2 and 3. The passenger bridge may include more telescopic elements than the illustrated three telescopic elements 12, 13, 14. Figure 3 shows a passenger bridge that has four telescopic elements 12, 13, 14, 15. Further the aircraft shown in Figures 2 and 3 are of mutually different types, the aircraft shown in Figure 2 being larger than the type of aircraft shown in Figure 3 and is equipped with three doors.

Figure 2 shows the passenger bridge in a parking position, in which the telescopic elements have been retracted and the cabin 4 of the passenger bridge has been manoeuvred to a position close to a terminal building 7 by means of the driving apparatus 8.

When a passenger bridge shall be connected to an aircraft 2, the driving apparatus is caused to move the outer part 4 of the bridge from the parking position shown in Figure 2 to a position 4' in which the outer bridge part has passed the wing tip 16 and the telescopic parts have been extended. The driving apparatus is then caused to move, e.g., along a line illustrated by the arrow 17 in Figure 2, to a predetermined position close to the door 3 of said aircraft. The cabin 4 is finally manoeuvred from the aforesaid position to a position of abutment with the body of the aircraft and around the door 3. This position is shown in Figure 3.

According to one preferred embodiment of the invention, the inner part 6 of the passenger bridge 1, and also its outer part 4, is caused to take a vertical position such that the bridge 1 will be clear of the upper side of the wing prior to said bridge being moved in over the wing of an aircraft.

According to a highly preferred embodiment of the invention, the aforesaid further elements in the form of a so-called rotunda 18 and a non-telescopic tunnel element are provided at the inner end of the bridge. The non-telescopic tunnel element 19 connects the rotunda 18 with the terminal building 7. In this case, the rotunda 18 is brought to said vertical position and the non-telescopic tunnel element is swung in the vertical plane when the vertical position of the rotunda 18 is changed.

According to an alternative embodiment, not shown, a rotunda of the same or corresponding type is connected directly to the terminal building. This rotunda can also be raised and lowered by means of a lifting device, such as a hydraulic ram. In the case of this embodiment, differences in height between the floor of the rotunda and the floor of the terminal building can be compensated for by steps or a stairway.

The rotunda 18 is thus raisable and lowerable so as to be able to take said vertical position. The non-telescopic tunnel element 19 is hinged to both the rotunda 18 and the terminal building 7 by means of suitable hinge means or the like. Expandable bellow-like structures 20, 21 of a suitable known kind are provided in the junction between said tunnel

element 19 and the rotunda and terminal building respectively.

To this end, the rotunda 18 is carried by a vertical, ground-mounted column or pillar 22 that includes a lifting device, such as a hydraulic ram, which functions to change the length of the column and therewith move the rotunda vertically.

The outer part of the passenger bridge is supported from the driving apparatus 8 by means of a column or pillar 23. This column includes a lifting device, such as a hydraulic ram, so as to be able to change the length of the column and therewith bring the outer end 4 of the bridge to different vertical positions.

According to one highly preferred embodiment, the non-telescopic tunnel element 19 has a length which corresponds approximately to 25% to 75% of the maximum length of the bridge, including said tunnel element 19. This enables the requisite telescopic length to be made shorter than if the rotunda were connected directly to the terminal building as in the case of known solutions. Furthermore, when the rotunda is in its highest or its lowest vertical position, the maximum slope of the floor in the non-telescopic tunnel element will be relatively small and will not therefore be troublesome to walking passengers.

According to another preferred embodiment of the invention, the floor 24 of the cabin 4 is located on a lower level than the floor 25 of the outermost tunnel element 14, where the two levels are interconnected by a step.

Thus, according to the present invention, the outer part of the passenger bridge is moved to the rear part of the aircraft. According to one preferred method of procedure, the passenger bridge is caused to carry electric cables 26 and hoses 27-30 for servicing an aircraft, such as supplying start air, emptying latrines, supplying electricity, water and the like, said cables and hoses being connected to the rear part of an aircraft directly from the bridge. This reduces the need for ground service vehicles and other apparatus around the aircraft.

It will be obvious that the present invention solves the problems mentioned in the introduction.

Although the invention has been described above with reference to exemplifying embodiments thereof, it will be obvious that these embodiments can be modified. For instance, the apparatus used to drive the passenger bridge may include more than one pair of wheels and more than one support device. Similarly, the telescopic part of the passenger bridge may be supported by a further support device corresponding to the driving apparatus 8 and placed between the rotunda and the cabin, wherewith when the cabin is positioned at the rear door of the aircraft said further support device will be located forwardly of the leading edge of the wing of said aircraft.

It will therefore be understood that the invention is not restricted to the aforedescribed and illustrated embodiments thereof and that modifications can be made within the scope of the following Claims.

CLAIMS

1. A method of connecting the outer end (4) of a passenger bridge (1) to an aircraft door (3) located on one side of the aircraft and rearwardly of an aircraft wing (5), where the inner end (6) of the passenger bridge is connected to a terminal building (7) via at least one further element for pedestrian traffic, whereby the passenger bridge can be moved through the medium of a driving apparatus (8) arranged on the outer part of said bridge and resting on wheels (9, 10) against an apron surface (11), and wherein the passenger bridge includes two or more telescopic parts (12-15), **characterised** by driving the passenger bridge (1) in relation to a parked aircraft by means of said driving apparatus (8) such as to cause the driving apparatus and the outer part (4) of said bridge to pass outwardly of the wing of the aircraft and thereafter in behind said wing for connection with the rear door (3) of said aircraft.

2. A method according to Claim 1, **characterised** by causing the inner part (6) of said bridge and also its outer part (4) to take a vertical position in which the passenger bridge (1) is clear of the upper side of the wing prior to moving said bridge in over the wing of an aircraft.

3. A method according to Claim 2, **characterised** in that there is provided adjacent the inner end (6) of the passenger bridge a rotunda (18) which is connected to a terminal building (7) via a non-telescopic tunnel element (19) between said terminal building and said rotunda, said rotunda (18) being caused to take said vertical position and said non-telescopic tunnel element (19) being caused to swing in the

vertical plane as the vertical position of the rotunda (18) is changed.

4. A method according to any one of Claims 1, 2 or 3, **characterised** by carrying on the passenger bridge (1) electric cables (26) and hoses (27-30) for ground servicing of an aircraft, such as for delivering start air, emptying latrines, supplying electricity, water, and like services, said cables and hoses being connected to a rear part of the aircraft directly from the passenger bridge.

5. An arrangement for connecting the outer end (4) of a passenger bridge (1) to a door (3) in the fuselage of an aircraft, said door (3) being located at the rear end of the aircraft rearwardly of an aircraft wing (5), wherein the inner end (6) of said bridge is connected to a terminal building (7) through the medium of at least one further element for pedestrian traffic, wherein the passenger bridge (1) is mobilised by means of a driving apparatus (8) provided at the outer part of said bridge and running on wheels (9, 10) which engage the airport apron (11), and wherein said bridge includes two or more telescopic parts (12-15), **characterised** in that the passenger bridge (1) has a total length which will enable the bridge to be driven by means of said driving apparatus (8) such that said driving apparatus and the outer part of said bridge are able to pass outwardly of a wing (5) of a parked aircraft and thereafter pass behind the wing for connection of the outer part (4) of said bridge with a rear door (3) of said aircraft.

6. An arrangement according to Claim 5, **characterised** in that the inner part (6) and the outer part (4) of the

passenger bridge can be raised and lowered so as to take a vertical position in which the passenger bridge is clear of the upper side of said wing.

7. An arrangement according to Claim 6, **characterised** by a rotunda (18) which is located at the inner end (6) of the bridge and which is connected to a terminal building (7) through the medium of a non-telescopic tunnel element (19) that extends between said terminal building and said rotunda; in that the rotunda (18) is raisable and lowerable so as to be able to take said vertical position; and in that the non-telescopic tunnel element (19) is hinged to both the rotunda (18) and the terminal building (7).

8. An arrangement according to Claim 5, 6 or 7, **characterised** in that the rotunda (18) is supported by a vertical, ground-mounted column (22) which includes a lifting device, such as a hydraulic ram, adapted to change the length of the column and therewith move the rotunda (18) in a vertical direction.

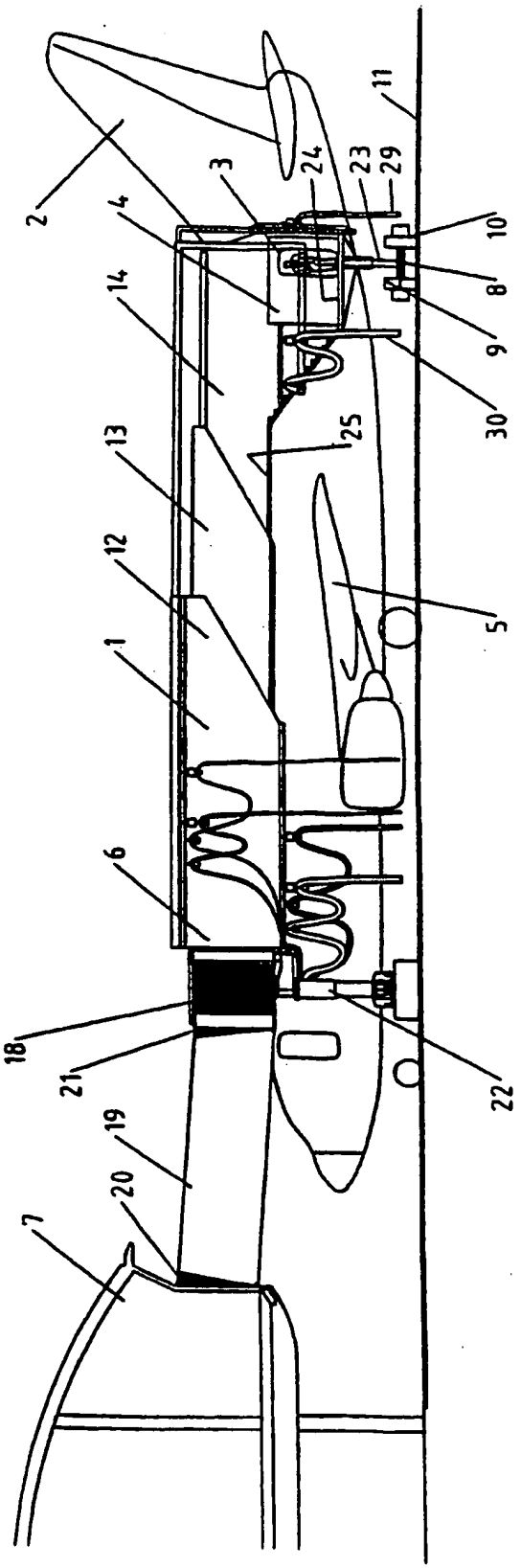
9. An arrangement according to Claim 5, 6, 7 or 8, **characterised** in that the length of the non-telescopic tunnel element (19) corresponds approximately to 25%-75% of the maximum length of the passenger bridge (1) including said non-telescopic tunnel element.

10. An arrangement according to any one of Claims 5, 6, 7, 8 or 9, in which the outer end of the outermost tunnel element includes a known cabin (4) intended for abutment with the aircraft fuselage, **characterised** in that the floor (24) of said cabin is positioned at a lower level than the floor (25)

of the outermost tunnel element (14), and in that the two floor levels are interconnected by step means.

11. An arrangement according to any one of Claims 5, 6, 7, 8, 9 or 10, **characterised** in that the passenger bridge (1) is equipped with electric cables (26) and hoses (27-30) for ground servicing an aircraft, such as for supplying start air, emptying latrines, supplying electricity, water and the like, said cables and hoses being intended for connection to the rear part of an aircraft directly from the passenger bridge (1).

Fig 1



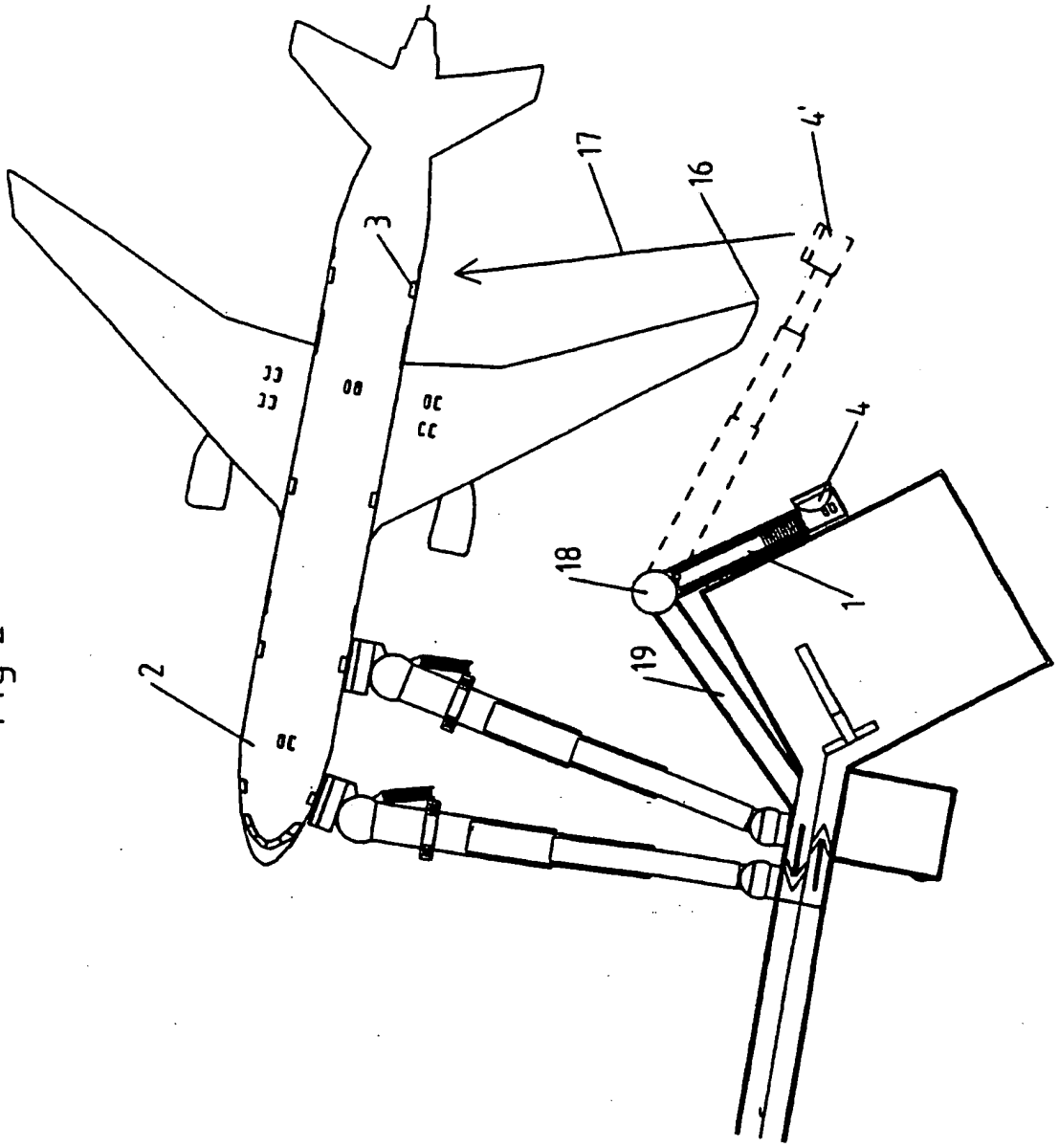


Fig 2

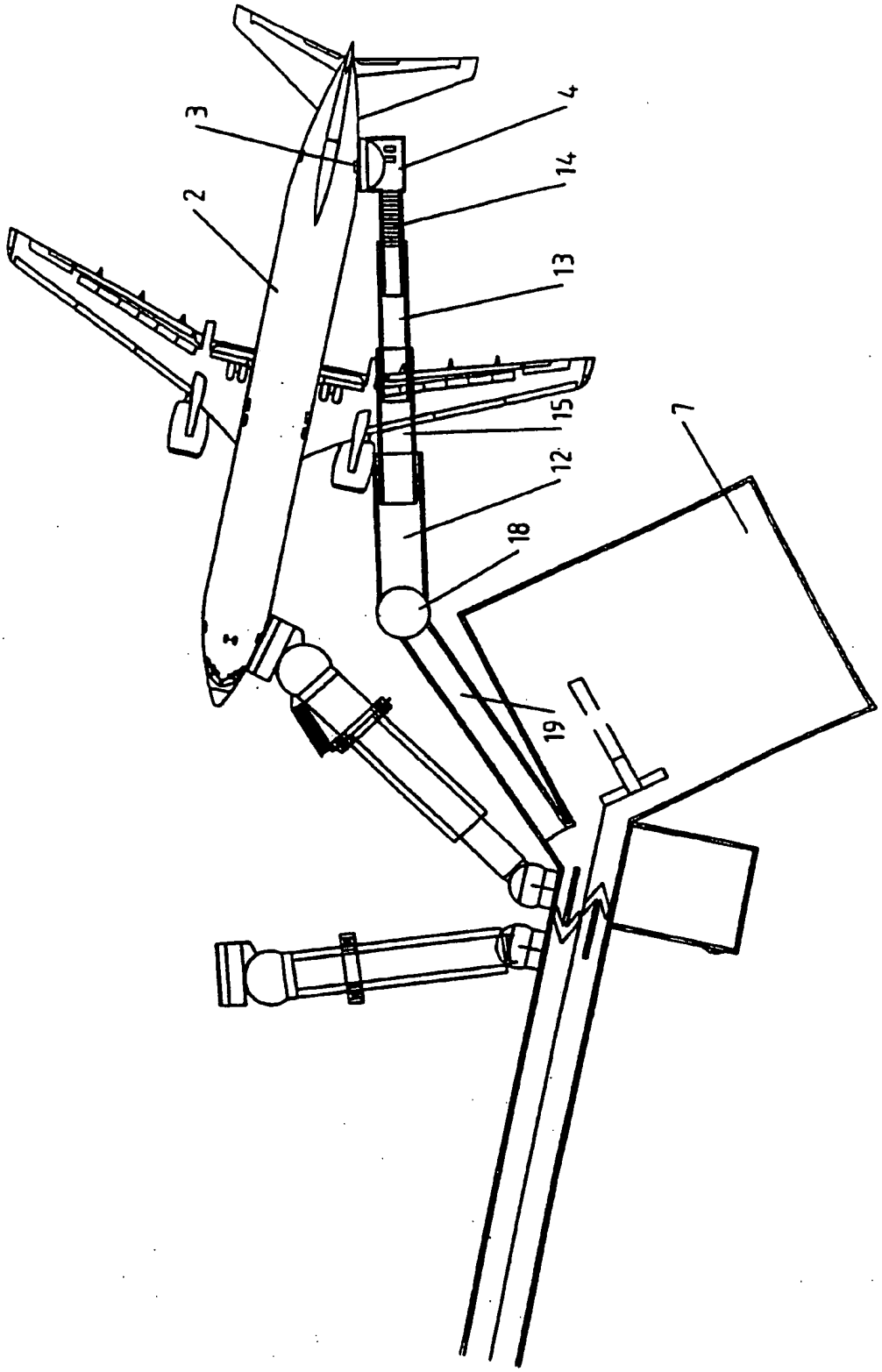
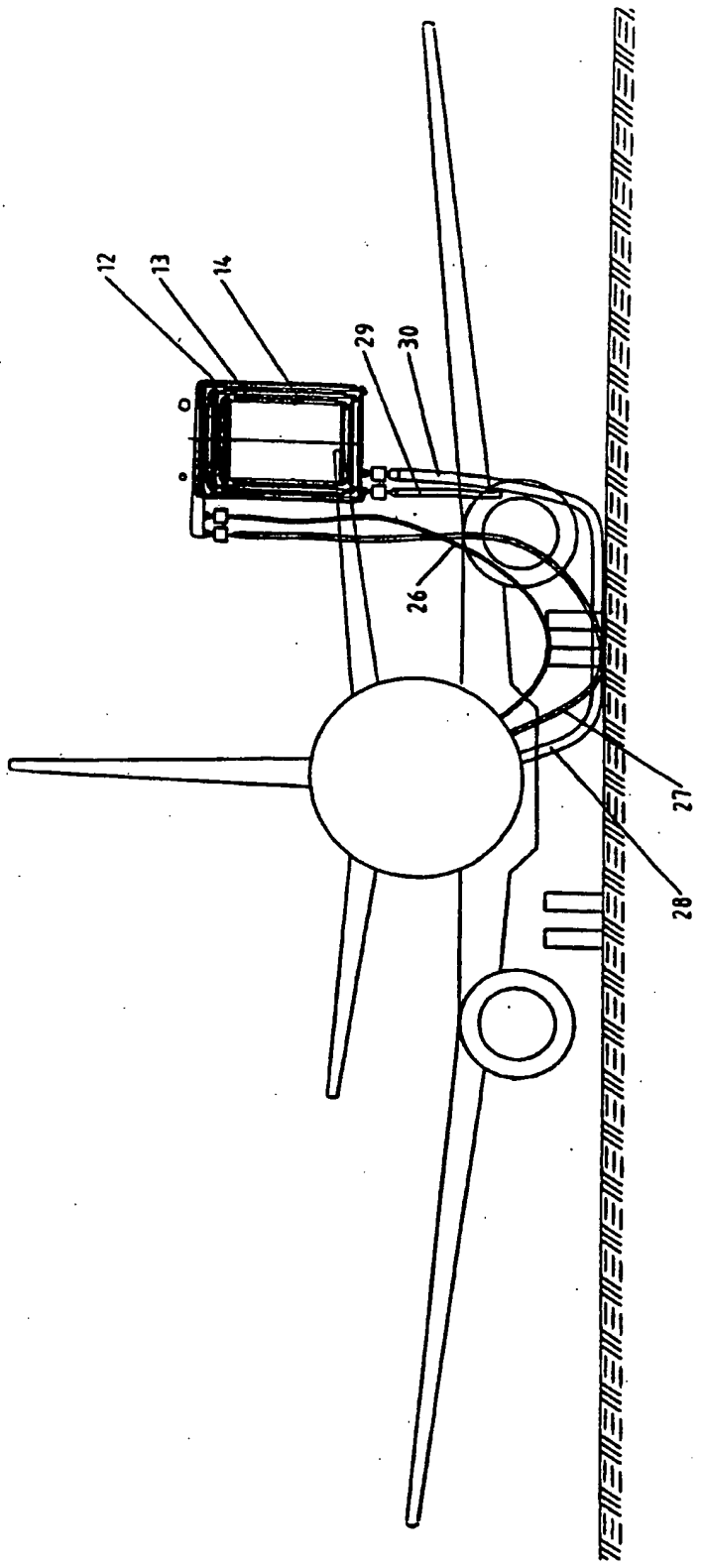


Fig 3

Fig 4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/00213

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B64D 9/00, B64F 1/305
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B. FIELDS SEARCHED

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IPC6: B64D, B64F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 1814165 A1 (BRAUER, KARSTEN), 13 August 1970 (13.08.70), page 6, line 16 - page 8, line 2, figures 11-12	1-3,5-10
Y		4,11
	--	
Y	US 4572550 A (HARDER), 25 February 1986 (25.02.86)	4,11
A		1-3,5-10
	--	
A	DE 1506107 A1 (STANRAY CORP), 14 August 1969 (14.08.69)	1-11
	--	

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International application No.
PCT/SE 99/00213

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 1202650 B (MASCHINENFABRIK AUGSBURG-NüRNBERG AKTIENGESELLSCHAFT), 7 October 1965 (07.10.65) --	1-11
A	DE 1963983 A1 (DORR-OLIVER INC), 9 July 1970 (09.07.70) --	1-11
A	DE 1531553 A1 (WEGMANN & CO), 2 April 1970 (02.04.70) -- --------	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

07/04/99

International application No.
PCT/SE 99/00213

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1814165 A1	13/08/70	NONE	
US 4572550 A	25/02/86	NL 8302832 A	01/02/85
DE 1506107 A1	14/08/69	NONE	
DE 1202650 B	07/10/65	NONE	
DE 1963983 A1	09/07/70	BE 743549 A	28/05/70
		BR 6915569 D	00/00/00
		CH 495251 A	31/08/70
		FR 2026952 A	25/09/70
		GB 1239119 A	14/07/71
		NL 6919264 A	25/06/70
		SE 368370 B	01/07/74
		US 3538529 A	10/11/70
		ZA 6908576 A	28/07/71
DE 1531553 A1	02/04/70	NONE	